

ENGINE – INGENIUM I6 3.0L PETROL (G2344340)

SPECIFICATIONS

Lubricants, Fluids, Sealers and Adhesives

	SPECIFICATIONS
Oil pan to cylinder block sealant	Loctite 5970 BM Black
Engine Oil	SAE 0W-20 oils conforming to Jaguar Land Rover engine oil specification STJLR.51.5122

	LITERS
Engine oil, initial fill with oil filter	10.44
Engine oil, service fill with oil filter change	8.82
Engine oil, service fill without oil filter change	8.71

General Specifications

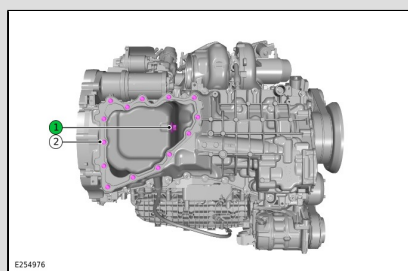
ITEM	SPECIFICATION
Type	3.0 litre, inline 6, turbocharged and intercooled petrol engine, twin overhead camshaft, 4 valves per cylinder
Cylinder arrangement	Inline 6
Cylinder numbering	No.1 from the accessory drive end
Bore - nominal	83.0 mm (3.27 in)
Stroke	92.29 mm (3.64 in)
Capacity	2996 cm ³ (182.8 in ³)
Firing order	1 - 5 - 3 - 6 - 2 - 4
Compression ratio	10.5:1
Direction of rotation	Clockwise viewed at accessory drive
Cylinder head maximum permitted warp (flatness specification)	
Cylinder block maximum permitted warp (flatness specification)	0.2 mm (0.008 in)

ITEM	SPECIFICATION
Cylinder head maximum permitted longitudinal warp	0.05 mm (0.001968504 in)
Cylinder head maximum permitted transverse warp	0.03 mm (0.001181102 in)
Maximum power/torque - 360 PS	
Maximum power	265 kW (360 PS) @ 5500rpm
Maximum Torque	495 Nm (365 lb/ft) @ 2000 - 5000rpm
Maximum power/torque - 400 PS	
Maximum power	294 kW (400 PS) @ 5500rpm
Maximum Torque	550 Nm (406 lb/ft) @ 2000 - 5000rpm
Crankshaft end play:	
Minimum	0.15 mm
Maximum	0.35 mm
Main bearing clearance:	
Minimum	0.030 mm
Maximum	0.054 mm

Main bearing Selection

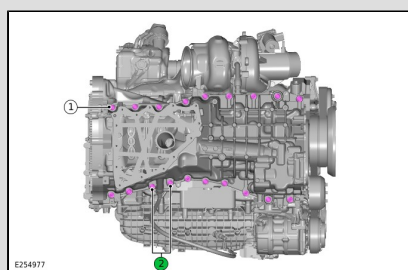
BEARING GRADE COLOR	CRANKSHAFT JOURNAL DIAMETER	CYLINDER BLOCK BORE DIAMETER
Purple - Brown	54.979 to 54.984 mm	59.025 to 59.032 mm
Purple - Purple	54.979 to 54.991 mm	59.018 to 59.032 mm
Black - Purple	54.979 to 54.998 mm	59.014 to 59.032 mm
Black - Black	54.984 to 55.000 mm	59.014 to 59.032 mm
Orange - Black	54.992 to 55.000 mm	59.014 to 59.025 mm
Orange - Orange	54.998 to 55.000 mm	59.014 to 59.016 mm

COMPONENT TORQUE LOCATION



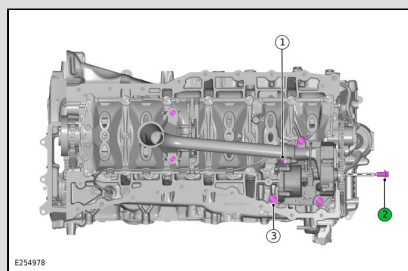
Item	Description	Nm	lb-ft
1	Oil pan drain plug	30	22
2	Oil pan bolts	25	18.4

COMPONENT TORQUE LOCATION



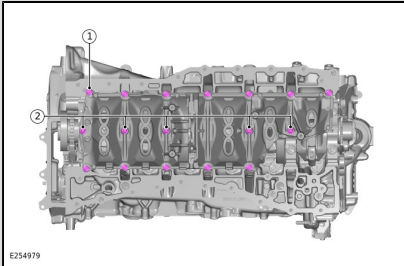
Item	Description	Nm		lb-ft	
1	Oil pan extension bolts	25		18.4	
2	Oil pan extension bolts (M8 x 60)	Stage 1: 20	Stage 2: 90°	Stage 1: 14.8	Stage 2: 90°

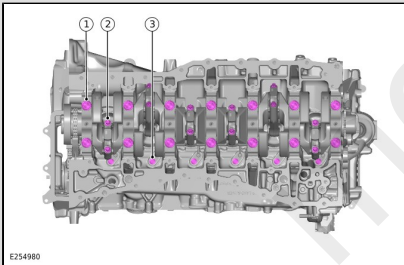
COMPONENT TORQUE LOCATION



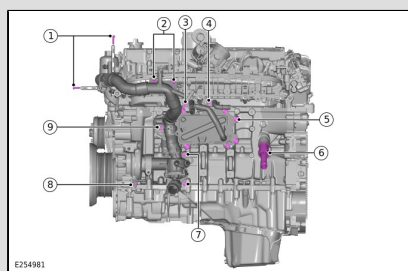
Item	Description	Nm	lb-ft
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COMPONENT TORQUE LOCATION					
1	Oil pump pick up pipe bolts	11.5		8.5	
2	Oil pump sprocket bolt	Stage 1: 40	Stage 2: 90°	Stage 1: 29.5	Stage 2: 90°
3	Oil pump bolts	25		18.4	

COMPONENT TORQUE LOCATION				
				
Item	Description			
1	Windage tray outer bolts			
2	Windage tray inner bolts			
		Nm	lb-ft	

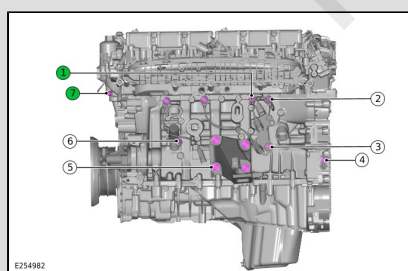
COMPONENT TORQUE LOCATION							
							
Item	Description	Nm			lb-ft		
1	Crankshaft main bearing cap bolts	Stage 1: 25	Stage 2: 37	Stage 3: 135°	Stage 1: 18.4	Stage 2: 27.3	Stage 3: 135°
2	Large end bearing cap bolts	Stage 1: 20		Stage 2: 125°	Stage 1: 14.8		Stage 2: 125°
3	Piston cooling jet bolts	11.5			8.5		

COMPONENT TORQUE LOCATION



Item	Description	Nm	lb-ft
1	Coolant bypass hose front bolts	11.5	8.5
2	Coolant bypass hose upper bolts	7	5.2
3	Oil cooler outlet pipe bolt	11.5	8.5
4	Charge air cooler inlet pipe bolt	11.5	8.5
5	Oil cooler bolts	25	18.4
6	Block heater	55	40.6
7	Thermostat housing bolts	11.5	8.5
8	Vacuum inlet pipe bolt	5	3.7
9	Coolant bypass hose lower bolt	11.5	8.5

COMPONENT TORQUE LOCATION



Item	Description	Nm	lb-ft
1	Cylinder block temperature sensor	10.5	7.7
2	Knock sensor bolts	20	14.8
3	Knock sensor wiring harness bolt	8.5	6.3
4	Crankshaft Position (CKP) sensor	8	5.9

COMPONENT TORQUE LOCATION			
5	Left engine mount bracket bolts	60	44.3
6	Piston cooling jet solenoid bolt	11.5	8.5
7	Cylinder head temperature sensor	10.5	7.7

COMPONENT TORQUE LOCATION

Diagram illustrating the component torque locations on an engine block. The diagram shows the engine block with various bolts highlighted in purple. Callouts 1, 2, 3, and 4 point to specific bolt locations. A green dot is also shown on the side of the engine block.

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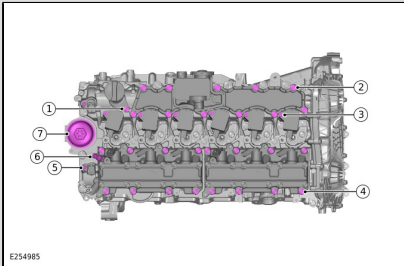
Item	Description	Nm		lb-ft	
1	Upper timing cover bolts	11.5		8.5	
2	Variable Camshaft Timing (VCT) solenoid bolts	9		6.6	
3	Drive plate bolts	Stage 1: 30	Stage 2: 120°	Stage 1: 22	Stage 2: 120°
4	Lower timing cover bolts	25		18.4	

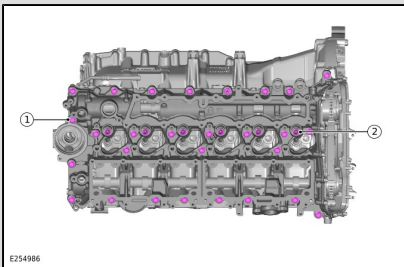
COMPONENT TORQUE LOCATION

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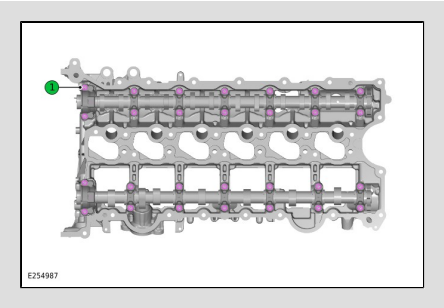
Item	Description	Nm		lb-ft	
1	Upper timing chain guide bolts	11.5		8.5	
2	Variable Camshaft Timing (VCT) actuator bolts	Stage 1: 25	Stage 2: 60°	Stage 1: 18.4	Stage 2: 60°
3	Upper timing chain oil jet bolt	11.5		8.5	
4	Upper timing chain tensioner	55		40.6	
5	Upper timing chain right guide bolt	25		18.4	

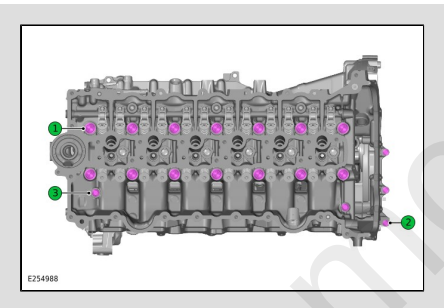
COMPONENT TORQUE LOCATION			
6	Lower timing chain tensioner bolts	11.5	8.5
7	Lower timing chain oil jet bolt	11.5	8.5
8	Lower timing chain right guide bolt	25	18.4
9	Lower timing chain left guide bolts	25	18.4
10	Idler sprocket bolt	35	25.8
11	Upper timing chain left guide bolt	25	18.4

COMPONENT TORQUE LOCATION			
			
Item	Description	Nm	lb-ft
1	Oil filler neck bolt	12	8.9
2	Engine vent oil separator bolts	11.5	8.5
3	Ignition coil bolts	8	5.9
4	Continuous Variable Valve Lift (CVVL) bolts	11.5	8.5
5	Camshaft Position (CMP) sensor bolts	8	5.9
6	CVVL oil temperature sensor	18	13.3
7	Oil filter element cap	25	18.4

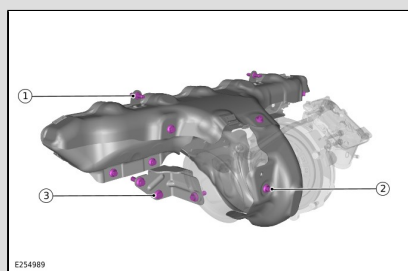
COMPONENT TORQUE LOCATION			
			

COMPONENT TORQUE LOCATION			
Item	Description	Nm	lb-ft
1	Camshaft carrier bolts	28	20.7
2	Spark plugs	22.5	16.6

COMPONENT TORQUE LOCATION			
			
Item	Description	Nm	lb-ft
1	Camshaft bearing cap nuts	11.5	8.5

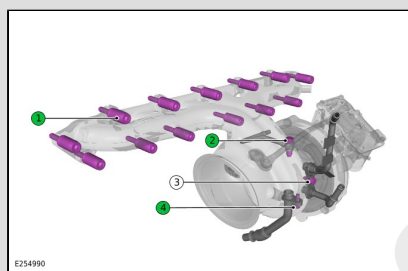
COMPONENT TORQUE LOCATION			
			
Item	Description	Nm	lb-ft
1	Cylinder head bolts		
1	Stage 1	20	14.8
1	Stage 2	90°	90°
1	Stage 3	180°	180°
2	Cylinder head bolts	11.5	8.5
3	Cylinder head bolts	25	18.4

COMPONENT TORQUE LOCATION



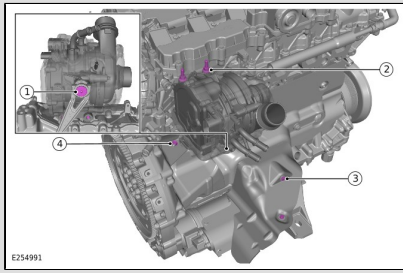
Item	Description	Nm	lb-ft
1	Turbocharger upper heatshield bolts	6.5	4.8
2	Turbocharger heatshield bolts	9	6.6
3	Turbocharger bracket bolts	25	18.4

COMPONENT TORQUE LOCATION



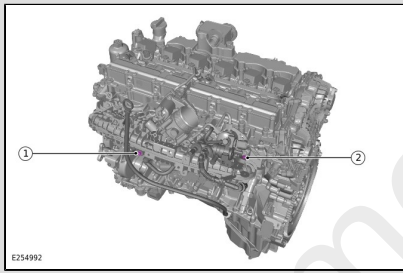
Item	Description	Nm	lb-ft
1	Turbocharger to cylinder head bolts		
	Stage 1	8	5.9
	Stage 2	12	8.9
	Stage 3	15	11
	Stage 4	135°	135°
2	Oil supply pipe bolt	18	13.3
3	Turbocharger coolant pipe bolt	11.5	8.5
4	Oil return pipe bolt	11.5	8.5

COMPONENT TORQUE LOCATION



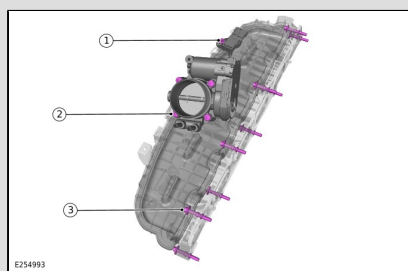
Item	Description	Nm	lb-ft
1	Electric supercharger bracket bolt	11.5	8.5
2	Electric supercharger bolts	25	18.4
3	Right engine mount bracket heatshield bolts	9	6.6
4	Electric supercharger bracket nut	8	5.9

COMPONENT TORQUE LOCATION



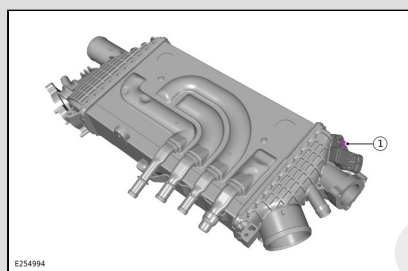
Item	Description	Nm	lb-ft
1	Oil level gauge bolt	7	5.2
2	Purge valve bolt	7	5.2

COMPONENT TORQUE LOCATION



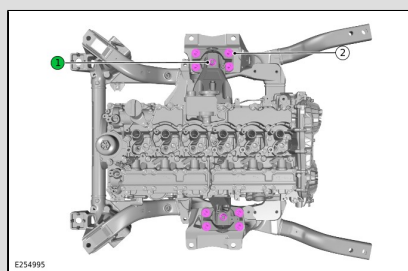
Item	Description	Nm	lb-ft
1	Manifold Absolute Pressure and Temperature (MAPT) sensor bolt	4.1	3
2	Throttle body bolts	11.5	8.5
3	Intake manifold bolts	11.5	8.5

COMPONENT TORQUE LOCATION



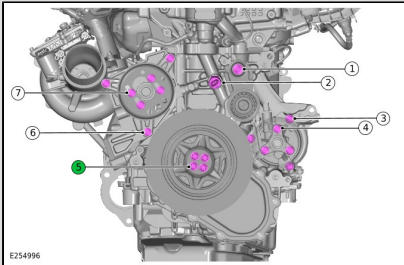
Item	Description	Nm	lb-ft
1	Charge air cooler pressure sensor bolt	4.1	3

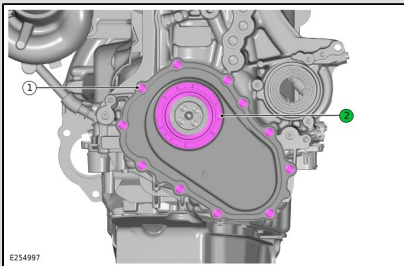
COMPONENT TORQUE LOCATION



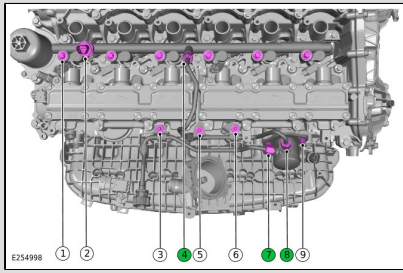
Item	Description	Nm	lb-ft
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COMPONENT TORQUE LOCATION			
1	Engine mounting bracket to engine mount nuts	110	81.1
2	Engine mount to subframe bolts	32	23.6

COMPONENT TORQUE LOCATION					
 E254996					
Item	Description	Nm		lb-ft	
1	Belt Integrated Starter Generator (BISG) belt idler pulley bolt	25		18.4	
2	Oil pressure and temperature sensor	15		11	
3	Coolant pump bolts	25		18.4	
4	Coolant pump pulley bolts	25		18.4	
5	Crankshaft pulley bolts	Stage 1: 37	Stage 2: 90°	Stage 1: 27.3	Stage 2: 90°
6	Viscous cooling fan pulley bracket bolts	25		18.4	
7	Viscous cooling fan pulley bolts	25		18.4	

COMPONENT TORQUE LOCATION			
 E254997			
Item	Description	Nm	lb-ft
1	Engine front cover bolts	11.5	8.5
2	Crankshaft front seal	30	22.1

COMPONENT TORQUE LOCATION



Item	Description	Nm	lb-ft
1	Fuel rail bolts	30	22.1
2	Fuel rail pressure sensor	37.5	27.7
3	High Pressure (HP) fuel pump inlet pipe bolt	11.5	8.5
4	HP fuel pump to fuel rail pipe union	20	14.8
5	HP fuel pump outlet pipe front bolt	11.5	8.5
6	HP fuel pump outlet pipe rear bolt	11.5	8.5
7	HP fuel pump inlet pipe union	20	14.8
8	HP fuel pump outlet pipe union	20	14.8
9	HP fuel pump bolts	14	10.3